networkMaryland

Customer Information Package

March 2004

Version 5b

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List of Version Changes

Date	Version	Changes
10/29/02	Final Draft	▪ N/A
10/30/02	v1	▪ Added Figure 5, Demarcation Diagram. ▪ Added List of Version Changes. ▪ Renumbered Section 1.3. ▪ Corrected section references throughout the document. ▪ Deleted reference to a non-existent table in section 4.1.2.
11/18/02	v2	▪ Added footnote *****. ▪ Reworded Section 1.1, Purpose. ▪ Added URL to the Roadmap in Section 1.2 and 10. ▪ Added NOC Acronym/Definition in Section 1.4 and 6. ▪ Reworded Section 2, paragraph 1 and 2. ▪ Clarified circuit ordering responsibilities in Section 4.1.1. ▪ Reworded Section 8, Customer Network Management.
12/16/02	v3	▪ Updated Figure 2, networkMaryland Design Overview.
12/30/02	v4	▪ Updated project contact information
07/22/03	v4a	▪ Updated project contact information, networkMaryland website, replaced State data security policy with reference to new IT security policy
11/05/03	v5	▪ Updated AUP, modified figures, update customer responsibilities, updated AUP major editing throughout document
01/06/04	v5a	▪ Updated networkMaryland Logo on Cover

02/06/04	v5b	▪ Revised networkMaryland Demarcation Point
		▪ Revised Customer Responsibilities
		▪ Revised Team Points of Contact Table

1- Introduction

1.1. Purpose

The purpose of this document is to provide value added and decision making information to potential customers about networkMaryland.

1.2. Roadmap
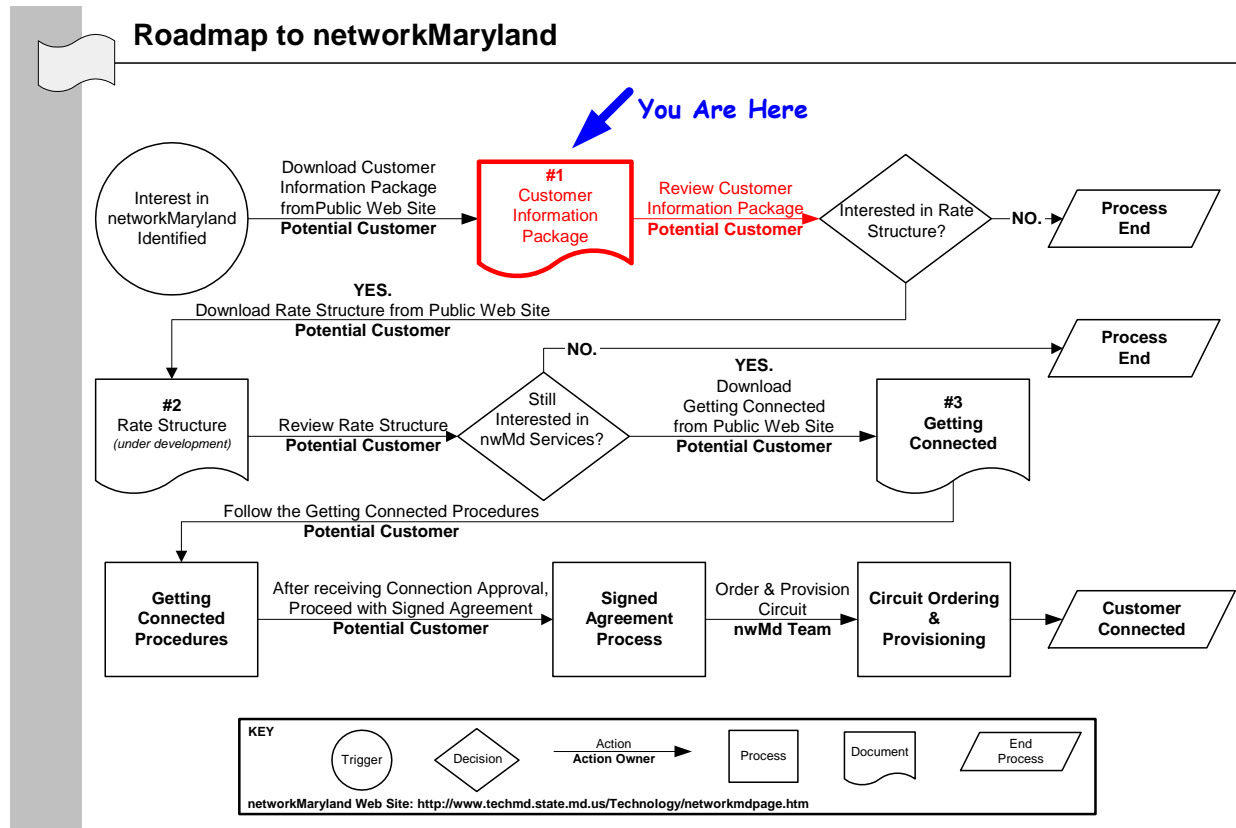
Figure 1. Roadmap – You Are Here

1.3. Document Organization

- Section 2 describes customer benefits of networkMaryland
- Section 3 contains an overview of networkMaryland
- Section 4 summarizes customer connections to networkMaryland
- Section 5 describes networkMaryland demarcations
- Section 6 details networkMaryland's service levels
- Section 7 contains networkMaryland's Acceptable Use Policy
- Section 8 outlines the customer's responsibilities
- Section 9 illustrates the next steps for connecting to networkMaryland

1.4. Related Key Documents

The following documents are key to connecting and operating on networkMaryland and should be reviewed as an attachment to this document.

- **State of Maryland Information Technology Security Policy & Standards, 06/2003**
  This document may be downloaded from www.dbm.Maryland.gov/Technology
- **networkMaryland Getting Connected Package**
- This document may be downloaded from www.networkmaryland.gov

1.5.Acronym List

ATM: Asynchronous Transfer Mode

AUP: Acceptable Use Policy

CBR: Constant Bit Rate (ATM service class)

DBM: Department of Budget and Management

DS3: Digital Signal Level 3 (45 Mbps) utilizes a BNC Coaxial interface

FRASI: Frame Relay to ATM Service Interworking

InterLATA: Any network circuit that crosses from one defined geographic area into another.

ISP: Internet Service Provider

LAN: Local Area Network

LATA: Local Access Transport Area

LEC: Local Exchange Carrier

Local Loop: Physical network infrastructure that extends from the POP to customer premise

MAN: Metropolitan Area Network

OSI: Open Systems Interconnection

networkMaryland Team: Members of DBM's networkMaryland Team

NOC: Network Operating Center

PCR: Peak Cell Rate

PMO: Program Management Office

POP: Point of Presence (Network Access Point)

PVC: Permanent Virtual Circuit

PVP: Permanent Virtual Path

SCR: Sustained Cell Rate

SwGI: Statewide Government Intranet

UNI: User-Network Interface

VLAN: Virtual Local Area Network

VBR: Variable Bit Rate (ATM service class)

VCI: Virtual Channel Identifier

VPI: Virtual Path Identifier

1.6. Definitions

- Network Operating Center (NOC) – the physical space, from which a large telecommunications network is managed, monitored and supervised. The NOC coordinates network troubles, provides problem management, and manages network changes.
- Permanent Virtual Circuit (PVC) – A logical connection from one port of the ATM network to another port of the ATM network
- Total Ingress Kilobytes – The total number of kilobytes (1000 bytes) offered by the ATM network
- Total Egress Kilobytes – the total number of kilobytes delivered by the ATM network across all PVCs
- Committed Burst Size (Bc) – The maximum amount of data (in bits) that the network commits to transfer under normal conditions
- Excess Burst Size (Be) – The maximum amount of uncommitted data (in bits) in excess of Bc that the network attempts to transfer under normal conditions
- Peak Cell Rate (PCR) – rate above which ATM cells are discarded
- Bc + Be Exceeded Kilo frames – Discarded frames due to excess data being sent above the maximum rate parameters of a given PVC
- Data Delivery Ratio or Rate (DDR) – The adjusted ratio of the total user data frames delivered across the frame relay network to the total user data frames offered to the frame relay network
- Cell Loss Ratio (CLR) – The ratio of cells unsuccessfully delivered across the ATM network to the total cells offered to the ATM network
- OSI Reference Model - A set of seven layers that define the different stages that data must go through to travel from one device to another over a network. This document addresses Layer 2, the Data Link layer and Layer 3, the Network layer. In the data link layer the appropriate physical protocol is assigned to the data and the type of network and the packet sequencing is defined. The network layer is responsible for the way that the data will be sent to the recipient including logical protocols, routing and addressing.

1.7. Points of Contact

Table 1. networkMaryland Team Points of Contact

Name	Function	Phone #'s	Location
Jason Ross	Director	410.260.7279	Annapolis
Joe Scher	Project Controller	410.260.7284	Annapolis
Tim Kwong	Project Engineer	410.260.7423	Annapolis
Mike Snyder	Customer Migration Manager	410.260.6131	Annapolis
Gary Schlueter	Customer Migration Manager	410.260.6130	Annapolis
Gary Moulton	Project Engineer	410.260.7095	Annapolis
Denis McElligott	Project Engineer	410.260.6125	Annapolis
Email List: mailto:networkMaryland@dbm.state.md.us			

2- networkMaryland Benefits

The Department of Budget and Management created networkMaryland to support the networking needs of the State of Maryland. With the focus on supporting the advancement of higher education, health care and government services, networkMaryland strives to provide a high level of service. Whether the agency's needs are InterLATA networking, Internet Services or access to the State Intranet, networkMaryland can provide the connection desired. Utilizing this network will provide the State of Maryland Public Sector with the benefits of a scalable network and cost savings.

networkMaryland benefits the State of Maryland by providing current and new services at higher data rates, lower prices and better scalability. networkMaryland provides circuit speeds from 56Kbps to OC-48 (2.5 Gbps) to their customers depending on the network solution. The use of ATM technology provides a level of flexibility in configuring circuit rates, which allows networkMaryland customers to configure the network to meet their demands and control costs. The networkMaryland mission is to provide comparable services at costs below that available through State contracts with commercial providers. This is most beneficial for both Internet services and the InterLATA data circuits most agencies use to connect statewide offices. The creation and use of networkMaryland will benefit the State of Maryland as a whole. This technology will provide education with the opportunity to reach greater resources. The access to the Internet will open doors to new services such as the ability to host World Wide Web sites and the extensive information found on the Web. The future of Wide Area Network (WAN) in Maryland is networkMaryland and it is available today!

3 - networkMaryland Overview

networkMaryland is a statewide high-speed backbone available throughout the State of Maryland to connect Public Sector customers' networks. The Public Sector is defined as State, county and municipal government agencies and departments, public libraries, public hospitals, public K-12 education, and higher education. networkMaryland has requested a ruling from the Public Service Commission to allow networkMaryland to provide services to non-governmental entities that receive state funds specifically: private hospitals, private institutions of higher learning, private institutions providing K-12 education and privately funded libraries. networkMaryland offers InterLATA transport and Internet services to the Public Sector.

networkMaryland Overview
(March 2004)
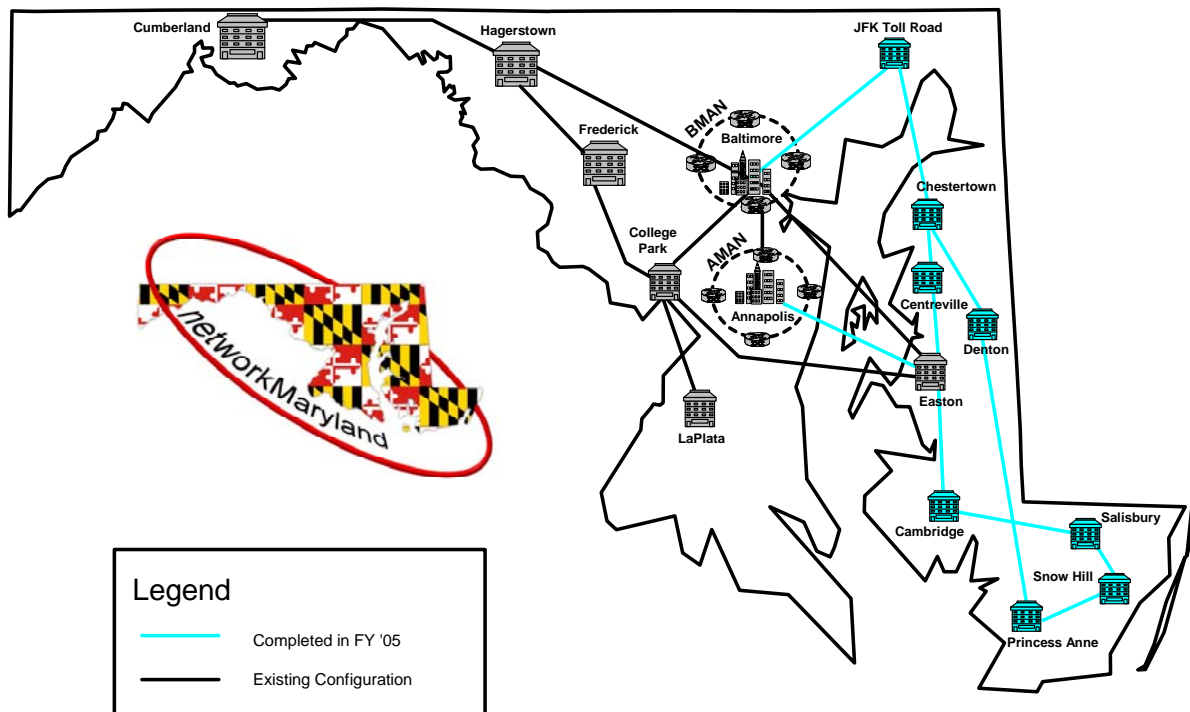
Figure 2. networkMaryland Design Overview

3.1 InterLATA Transport Services

networkMaryland is located in all 4 Local Access Transport Areas (LATAs). A LATA is a continuous geographic calling area established by a Federal Court with the divestiture of AT&T.

networkMaryland's InterLATA transport service is analogous to the services provided by a long distance phone carrier. The InterLATA transport service is designed to facilitate private WAN

networks across a common infrastructure. networkMaryland serves to provide a transport medium (Layer 2 of the OSI Reference Model) over which its customers can engineer their required network services. It is the customer's responsibility to design and manage the end-to-end network layer and route distribution protocols used to transport data across these services. It is expected that customers will design their WAN topologies in an efficient manner in conjunction with networkMaryland resources. networkMaryland supports native ATM services across its infrastructure. Even though the networkMaryland CORE uses ATM technology, the network uses Ethernet, Frame-Relay and limited DS-1 based UNI services to interface with networkMaryland customers.

BALTIMORE LATA

Baltimore County
Baltimore City
Calvert County
Anne Arundel County
Howard County
Carroll County
Cecil County
Harford County

WESTERN LATA

Garrett County
Allegany County
Washington County
Fredrick County

WASINGTON LATA

Charles County
Prince George's County
St. Mary's County
Montgomery County

EASTERN LATA

Somerset County
Worcester County
Wicomico County
Queen Anne's County
Dorchester County
Talbot County
Kent County
Caroline County

– – – LATA Boundary
(Approximate)

BALTIMORE LATA
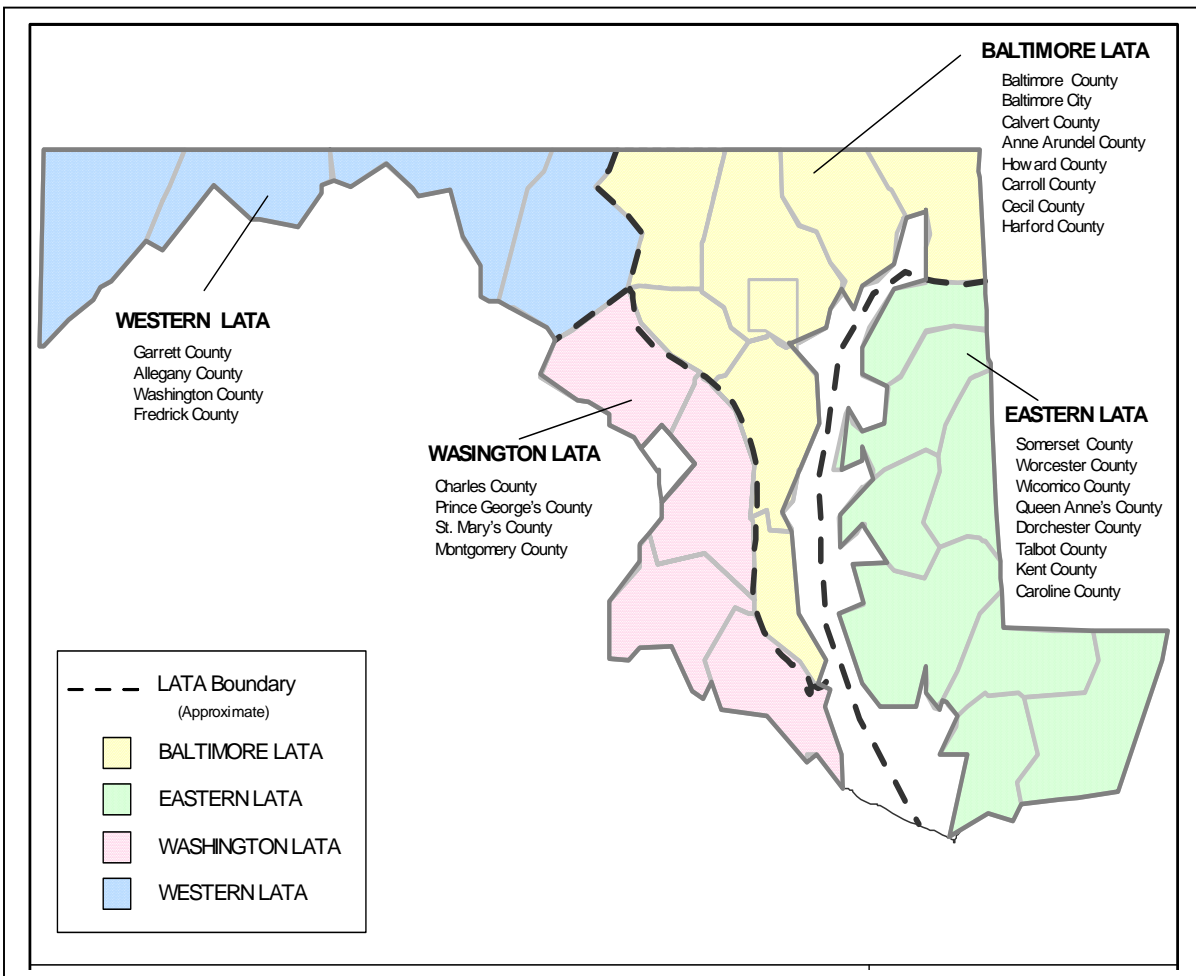EASTERN LATA
WASHINGTON LATA
WESTERN LATA

Figure 3. Maryland LATA Map

3.2 Internet Services

networkMaryland provides communication between the Internet and its Internet Service customers. networkMaryland's Internet Service is analogous to the routed services provided by a traditional Internet Service Provider (ISP). networkMaryland will provide the routed

infrastructure over which its Internet Service customers will communicate to the World Wide Web community.

Internet security measures are the sole responsibility of the customer. networkMaryland serves only to facilitate connectivity and makes no attempt to govern what traffic is allowed or disallowed. It is the sole responsibility of the customer to govern access to and from their internal networks through the use of firewall rules. All networkMaryland customers are required to adhere to the State of Maryland IT Security Policy. In an effort to help protect networkMaryland customers from obvious malicious activities, the following screening rules have been applied to the networkMaryland Internet providers. It is important to note that these filters are in no way intended to remove any security responsibility from its customers.

Customers should continue to configure their security devices assuming that these filters are not applied.
1. No packets with a Source address or Destination address within the RFC1918 defined private space are allowed to pass.
2. No packets with a source address within the NMD 167.102.0.0/16 address space is permitted to enter the NMD environment (anti-spoof)
3. No TCP traffic for ports (Source or Destination) 135, 139, or 445 (Microsoft) are permitted.
4.   SNMP Queries and Traps are not permitted.
These basic filters have been outlined merely to provide the NMD customers with an understanding of the limited filtering performed on the NMD Internet Services.

3.3 Statewide Government Intranet (SwGI)

SwGI is a networkMaryland service that provides a centralized resource for State entities to communicate with other State governmental entities and data centers. SwGI allows State agencies to create and share resources like FMIS, WebFleet Master, DNS, MVA applications and email relay services.

3.4 Circuit Sizes

networkMaryland provides a variety of circuit bandwidths to allow for the flexible provisioning of circuits and proper utilization of resources. The ATM platform allows networkMaryland to provide circuits in the following bandwidths:

Table 2. networkMaryland Circuit Speeds Available

Available Circuit Bandwidth	56K	128K – 1.5Mbps	1.5 Mbps	2-10 Mbps (provisioned at 1 Mbps increments)	15 Mbps and above
InterLATA Transport	X	X	X	X	X
SwGI Service		X	X	X	
Internet Service			X	X	X

Circuit sizes can be determined by current usage and growth for the immediate future. Increases can be made in the future at the predetermined increments, based on the initial provisioning.

4 - networkMaryland Connections

This section discusses the detailed interface requirements for each of the services provided by networkMaryland. The descriptions have been broken into physical and logical interface requirements.

4.1 Physical Connections

networkMaryland offers three methods of physical connectivity into a networkMaryland Point of Presence (POP) or a Metropolitan Area Network (MAN):

- Local Loop circuits provided by a public Local Exchange Carrier (LEC)
- Private fiber optic cable for direct connectivity
- Twisted pair copper (CAT 5) cable for collocation connectivity

Both the Baltimore MAN and the Annapolis MAN are collocated with networkMaryland. Section 4.1.4 discusses support for nonstandard connections to networkMaryland.
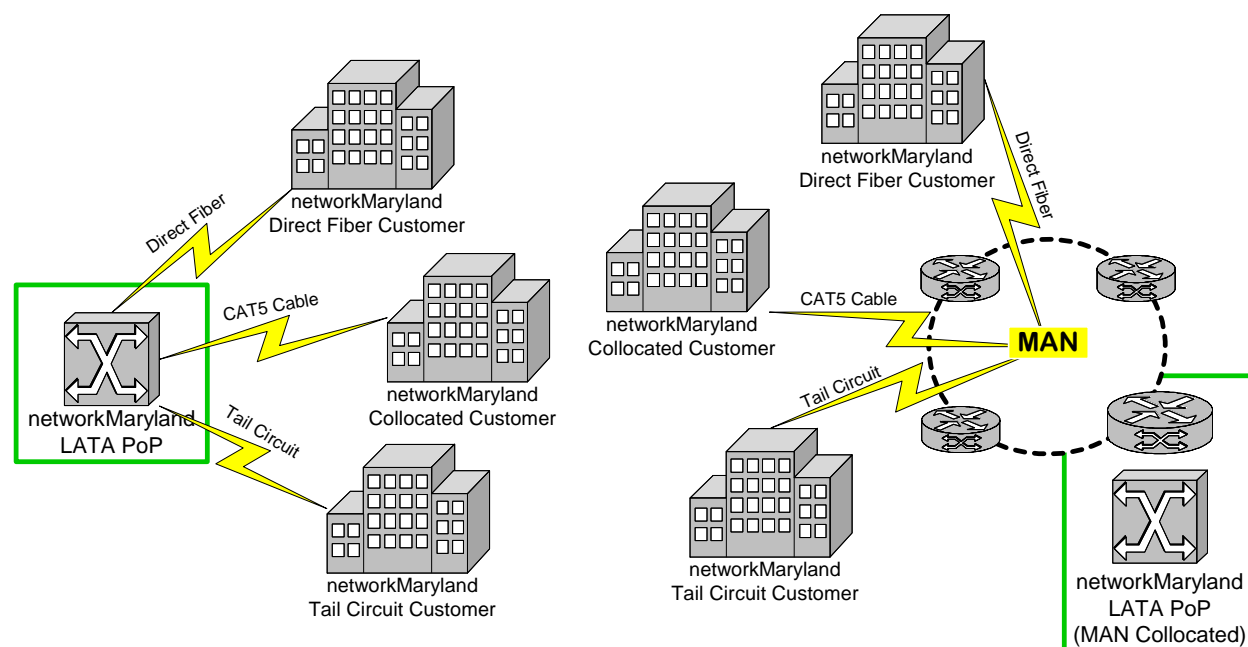
Figure 4. networkMaryland Connectivity Diagram

4.1.1 Local Loops

Customers of networkMaryland may contract with the LEC for ATM or Frame-Relay services to connect to the nearest networkMaryland POP or MAN. State Agencies will order their local loop circuits through Department of Budget and Management Telecommunications. Non-State Agencies (other entities) wishing to connect to networkMaryland will order their own local loop circuit using the circuit ordering guidelines in the *Getting Connected Package*. The *Getting Connected Package* is available for download from the networkMaryland web site "www.networkMaryland.gov" under the "Getting Connected" hyperlink. Interfaces to the LEC

are governed by the specific requirements of that carrier. Currently, native ATM services are supported on DS1, DS3, or Optical Carrier interfaces (OC3 typically).

4.1.2   Direct Private Fiber

networkMaryland will support connections via direct fiber optic cable into any networkMaryland fiber PoP. networkMaryland will provide support for both singlemode and multimode physical fiber optic interfaces. The standard line protocol to networkMaryland over direct fiber will be ATM. networkMaryland supports OC3c and OC12c. OC48c is available on a case-by-case basis.

4.1.3   Twisted Pair Copper Cable (CAT 5) for MAN Collocation

networkMaryland will support IEEE 802.3u and 802.3 compliant RJ-45 10/100 Ethernet connections within the Baltimore and Annapolis MANs. It is the customer's responsibility to extend (if required) the provided copper-based Ethernet interface(s). The Ethernet interfaces provided by networkMaryland support 802.1q VLAN trunking protocols as well as the Cisco ISL proprietary VLAN trunking protocol. The IEEE 802.1d spanning tree standard is utilized to ensure single path bridged network integrity.

Maximum Cabling Distance:

- 10BaseTX and 100BaseTX Fast Ethernet: Category 5 UTP: 328 ft (100m), 100-ohm STP: 328 ft (100m) half or full-duplex

All networkMaryland Ethernet connections are configured with features that will prevent Customers from participating in the networkMaryland Ethernet Spanning-Tree Topology. This serves to protect networkMaryland and its customers from mis-configured and/or malfunctioning bridging equipment. The networkMaryland team will work with customers to ensure the proper configuration of Ethernet interfaces.

4.1.4   Nonstandard Connections

networkMaryland can be engineered to support several other types of connections. Any non-standard connection will be available on an individual case-by-case basis. A proposal using the standard JCR 49 format must be submitted to the networkMaryland Project Team for approval. (This form is available for download on networkMaryland's public web site: "www.networkMaryland.gov" under the "Getting Connected" hyperlink). DBM has the responsibility to make the final determination as to whether or not a request for a nonstandard connection will be granted.

The definition of a nonstandard connection is any proposal impacting networkMaryland assets that is not a customer request for service. One example is a resource-sharing proposal requesting or offering dark fiber "owned" by networkMaryland. Another example is a proposal from a state or local public entity requesting use of a networkMaryland-owned asset.

4.2   Routing and Addressing Guidelines

The following sections describe the network layer addressing and routing guidelines for each of the services offered by the networkMaryland system.

4.2.1   InterLATA Transport Services

With the Layer 2 transport services network, the system does not participate in any network or higher layer protocols and therefore networkMaryland does not specify requirements on these protocols. It is the customer's sole responsibility to design and maintain the network layer environment that utilizes the networkMaryland Layer 2 transport services.

4.2.2   Internet Services

Each customer of networkMaryland is assigned a block of Internet usable IP addresses based on their individual requirements. networkMaryland will further provide the IP address and subnet mask to be assigned to the egress interface of the customer's termination equipment (the interface that connects to networkMaryland Internet PoP - see Figure 4.) The customer will be responsible for ensuring that all communications destined for the Internet are routed to the networkMaryland PoP provided next-hop Internet Gateway address. Generally networkMaryland will not enter into any dynamic IP routing relationship with any of its Internet customers. All routing information exchanged between a customer and networkMaryland is facilitated via the use of static routes. Cases where dynamic routing exchanges are required to support a particular customer's business requirements (i.e. load balancing, automatic failover redundancy) will be evaluated on a case by case basis.

The customer shall ensure that the egress interface on their equipment is configured to return both ICMP echo request (ping) responses as well as ICMP TTL expired messages (used in trace route) when the source address is a networkMaryland host (167.102.0.0/16). This will facilitate the networkMaryland NOC in helping customers to troubleshoot their connections.

4.2.3   SwGI Services

The purpose of the Statewide Government Intranet (SwGI) is to facilitate agency-to-agency communications over a routed IP domain using private addresses (RFC 1918.) This is to ensure effective communications among all participants and security as the private addresses are not routable on the public Internet. Each SwGI customer is assigned a block(s) of Intranet-usable IP addresses based on their individual requirements. DBM is the State IP address Registrar that is responsible for the assignments of the address block(s). Agencies are entitled to use whatever private address space they wish for their own network. However, the DBM-assigned addresses must be used externally to ensure there are no conflicts within the SwGI routed domain.

networkMaryland will provide the IP address and subnet mask to be assigned to the egress interface of the customer's termination equipment (the interface that connects to networkMaryland Intranet PoP.) The customer will be responsible for ensuring that all communications destined for the Intranet (i.e. 10.0.0.0/8, 172.16.0.0/16, 192.168.0.0/24) addresses provided by networkMaryland) are routed to the networkMaryland PoP provided next-hop Intranet gateway address. Generally networkMaryland will not enter into any dynamic IP routing relationship with any of its Intranet customers. All routing information exchanged between a customer and networkMaryland is facilitated via the use of static routes. Cases where dynamic routing exchanges are required to support a particular customer's business requirements (i.e. load balancing, automatic failover redundancy) will be evaluated on a case-by-case basis. The customer shall ensure that the egress interface on their equipment is configured to return both ICMP echo request (ping) responses as well as ICMP TTL expired messages.
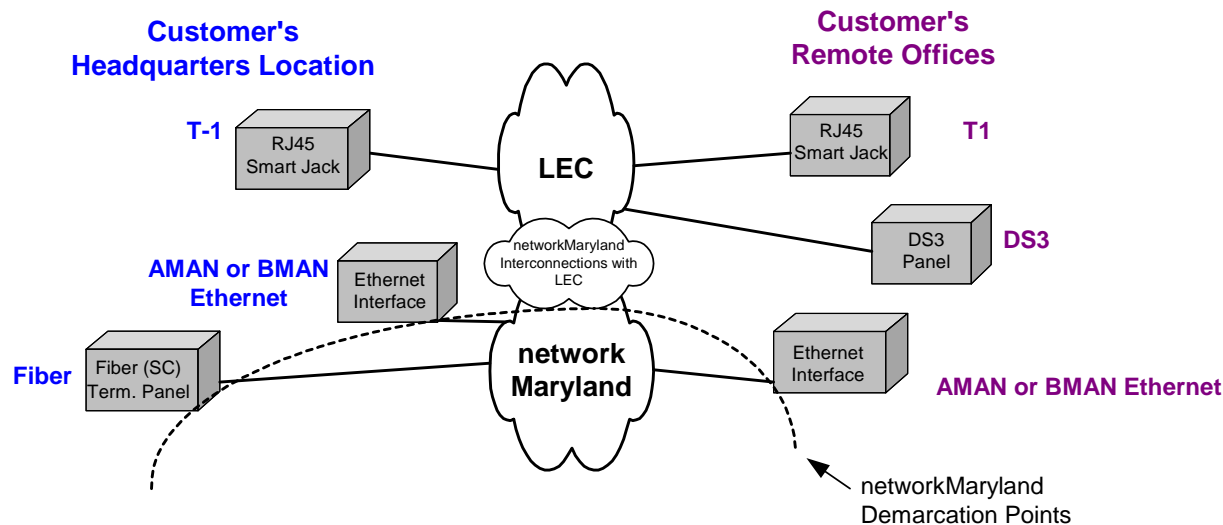
5 - networkMaryland Demarcation

Figure 5. networkMaryland Demarcation Diagram

5.1 Local Loop Circuits

networkMaryland is responsible for ensuring communications up to the demarcation point established by the LEC where networkMaryland equipment terminates. NetworkMaryland is not responsible for any LEC circuits required for the customer to interconnect with networkMaryland. The customer is responsible for supplying, as well as maintaining and configuring, any equipment necessary to terminate the connection. This includes but may not be limited to the CSU/DSU, router, and circuit extensions to the customer's POP.

In the event that a circuit problem is detected, the customer will contact the networkMaryland NOC. The NOC will identify the problem and take the necessary actions to restore the circuit. If the problem is traced to customer-owned equipment (i.e. CSU/DSU, router, etc.) the customer will be contacted and informed of the findings. In the event that the problem is determined to exist within the Local Loop the customer will be responsible for coordinating with the LEC to support any required technician dispatch.

In the event that a routing problem is detected, the customer will contact the networkMaryland NOC. The NOC will identify the problem and take the necessary actions to resolve the problem. networkMaryland is responsible for the routing and advertising of the customer's assigned Internet subnet and/or State Wide Government Intranet subnet. The customer may be asked to provide configuration parameters for equipment relevant to the connection. Routing problems internal to a customer network are the responsibility of that customer.

5.2 Direct Private Fiber

networkMaryland is responsible for ensuring communication up to and including the demarcation point for users connecting via private fiber. The demarcation is typically a fiber distribution panel or an optical interface on the networkMaryland POP equipment. The customer is responsible for supplying, as well as maintaining and configuring, any equipment necessary to terminate the connection. This includes but may not be limited to the router, Ethernet switch, or ATM switch, as well as the fiber extensions to the customer's POP.

In the event a circuit switching problem is detected, the customer will contact the networkMaryland NOC. The NOC will identify the problem and take the necessary actions to restore the circuit. If the problem is traced to customer-owned equipment (i.e. router, switch, etc.) the customer will be contacted and informed of the findings.

In the event a routing problem is detected (Statewide Government Intranet and Internet Services), the customer will contact the networkMaryland NOC. The NOC will identify the problem and take the necessary actions to resolve the problem. networkMaryland is responsible for the routing and advertising of the customer's assigned Internet and/or Statewide Government Intranet subnets only. If necessary, the customer will be asked to provide configuration parameters for equipment relevant to the connection. Routing problems internal to a customer network are the responsibility of that customer.

5.3 Twisted Pair Copper (CAT 5) for MAN Collocation

networkMaryland is responsible for ensuring communication up to and including the demarcation point for users connecting via the Baltimore and Annapolis MANs. The demarcation point in the MAN is the RJ-45 10/100 Ethernet port located on the networkMaryland POP equipment. The customer is responsible for supplying, as well as maintaining and configuring, any equipment necessary to terminate the connection. This includes but may not be limited to the router or Ethernet switch as well as any CAT 5 twisted pair and/or fiber optic extension to the customer's POP.

In the event a circuit problem is detected, the customer will contact the networkMaryland NOC. The NOC will identify the problem and take the necessary actions to restore the circuit. If the problem is traced to customer-owned equipment (i.e. router, switch, etc.) the customer will be contacted and informed of the findings.

In the event a routing problem is detected (SwGI and Internet Services), the customer will contact the networkMaryland NOC. The NOC will identify the problem and take the necessary actions to resolve the problem. networkMaryland is responsible for the routing and advertising of the customer's assigned Internet and/or Statewide Government Intranet subnets. If necessary, the customer will be asked to provide configuration parameters for equipment relevant to the connection. Routing problems internal to a customer network are the responsibility of that customer.

6 - networkMaryland Service Levels

The networkMaryland backbone is critical in supporting the business needs of state and local public entities by providing high-speed interLATA connectivity and ISP access. These service levels establish the obligations of networkMaryland to meet high standards of performance and outlines the responsibilities of using organizations. Additionally it describes the remedies available to users when the networkMaryland fails to deliver within prescribed parameters.

6.1 Maintenance Window

Routine network maintenance that may be traffic affecting will be performed between the hours of 11 PM- 5 AM Sunday through Saturday. networkMaryland will make every effort to schedule any service affecting outages to reside within the specific timeframe the customer specifies on the Customer Information Form. No maintenance will be performed without 5 business days' notice, unless an emergency situation requires such maintenance.

6.2 Points of Contact

Customers shall provide at least one support point of contact. These support point(s) of contact shall be used to notify the customer of problems, and shall be the person(s) through which the NOC is notified of problems. networkMaryland will provide phone and email contact information for the networkMaryland NOC. The Customer should use these contacts in the event they are experiencing a problem with a networkMaryland service

6.3 Facility Access to networkMaryland Equipment

Customers shall provide access to networkMaryland equipment as needed to perform routine and emergency maintenance and problem resolution. A contact list for customer's personnel responsible for network operations is also required to ensure proper notification and access to networkMaryland maintained network elements. Customers who have networkMaryland maintained equipment must provide 24x7x365 access to the site**.**

6.4 Service level Definition: Per-Circuit (PVC) Availability

For the ATM services provided to the user under a signed agreement, networkMaryland is committed to maintaining a per-PVC Availability of 99.5%. The availability applies to PVCs established between ATM endpoints on the managed network.

6.4.1 Measurement and Calculation

Per-Circuit (PVC) Availability is calculated as the percentage of time that PVC is capable of accepting and delivering information to the total time in a measurement period.

The calculation for availability for each of the PVCs in the user's network in a given month is as follows:

$$\frac{\text{(Hours in a Day x Days in a Month)} - \text{(Network Outage Time (in hours) for a Particular PVC)}}{\text{(Hours in a Day x Days in a Month)}}$$

Network outage time is measured in wall clock time. Measured time starts when networkMaryland monitoring personnel or the using organization opens a trouble ticket, and ends at the time connectivity is restored. The NOC will enter trouble tickets within five (5) minutes of notification or NOC detection of a network outage.

6.4.2 Components Excluded

The following are excluded from any network outage time when calculating the Circuit Availability:

- The failure of any components beyond the networkMaryland demarc
- Network downtime during scheduled maintenance windows
- The failure of any components which cannot be corrected due to inaccessibility of a customer site housing networkMaryland equipment
- Local Loop Circuits which another vendor such as Verizon, AT&T and WorldCom provides.
- Force Majeure (Natural Disaster, Acts of War or Terrorism and other forces beyond networkMaryland control).

6.4.3 Per PVC Availability Remedies:

Upon verification that a PVC is operating below the Committed Per-PVC Availability rate of 99.5%, networkMaryland shall evaluate the network and take corrective action to remedy the problem as quickly as possible.

6.4.4 Service Level Definition For: PVC Throughput

For ATM PVCs provided to the user under a signed agreement, networkMaryland is committed to maintain a Throughput of 100% (Committed Throughput).

Measurement and Calculation:

Throughput is measured in Kilobytes, where 1 Kilobyte is equal to 1000 bytes. The calculation for PVC Throughput is as follows:

$$\frac{\text{Egress Kilobyte Count x 100 percent}}{\text{Ingress Kilobyte Count} - \text{(Kilobytes above PCR or above Bc + Be)}}$$

The following are excluded from any determination of Throughput:

- Information lost due to failure of any components beyond the networkMaryland demarc
- Information lost due to downtime during networkMaryland's scheduled maintenance windows
- The failure of any components which cannot be corrected due to inaccessibility of a customer site housing networkMaryland equipment
- Any PVCs or access channels added or reconfigured during the month

- Backup PVCs
- Force Majeure

6.4.5 PVC Throughput Remedies:

Upon verification that a PVC is operating below the committed Per-PVC Throughput rate of 100%, networkMaryland shall evaluate the network and take corrective action to remedy the problem as quickly as possible.

6.5 Service Level Definitions For: Mean Time to Respond

In the event that on-site response is necessary, networkMaryland will maintain a maximum response time of 2 hours.

Elapsed time is measured from the time a particular trouble ticket is opened to the time assistance arrives at the problem site. The Mean Time to Respond calculation is as follows:

Total Time (in Hrs) to Respond for All Trouble Tickets That Require On-Site Maintenance
Total Number of Trouble Tickets That Require On-Site Maintenance

Upon verification by networkMaryland that the response level is below the specification, corrective action shall be taken to remedy the problem. networkMaryland shall have 10 business days from the date of noncompliance to correct the deficiency.

6.6 Service Level Definition For: Mean Time to Repair

networkMaryland will maintain a maximum of 4 hrs repair time for service problems that do not require on-site dispatches and a maximum of 8 hrs repair time for service problems that require on-site dispatches. In the event of a fiber optic cut every effort will be made to restore service as quickly as possible.

Elapsed time is measured from the time the trouble ticket is opened to the time service is restored to normal performance. The calculation for Mean Time to Repair is as follows:

Mean Time to Repair (Without On-Site Dispatches) =

Total Outage Time (in Hrs) for All Trouble Tickets That did not Need On-site Dispatches
Total Number of trouble Tickets that did not Need On-Site Dispatches

Mean Time to Repair (With On-Site Dispatches) =

Total Outage Time (in Hours) for All Trouble Tickets That Needed On-Site Dispatches
Total Number of trouble Tickets That Needed On-Site Dispatches

Excluded Items:
- Test and inquiry trouble tickets
- "No trouble found" trouble tickets

Upon verification by networkMaryland that the actual Mean Time to Repair level is below the specification, networkMaryland will take corrective action. networkMaryland shall have 5 business days from the date of noncompliance to report the cause of deficiency and take corrective action.

6.7   Service level Definition: Core Network Availability

The core network consists of each networkMaryland POP and the associated transport between the locations. networkMaryland is committed to maintaining a Core Network Availability of 99.9%

6.7.1   Measurement and Calculation

Core Network Availability is calculated as the percentage of time that a networkMaryland POP is capable of accepting and delivering data to the total time in a measurement period.

The calculation for availability the Core Network Availability in a given month is as follows:

$$\frac{\textbf{(Hours in a Day x Days in a Month)} - \textbf{(Network Outage Time (in hours) for a POP}}{\textbf{(Hours in a Day x Days in a Month)}}$$

Network outage time is measured in wall clock time. Measured time starts when networkMaryland monitoring personnel or the using organization opens a trouble ticket, and ends at the time connectivity is restored. The NOC will enter trouble tickets within five (5) minutes of notification or NOC detection of a network outage.

6.7.2   Components Excluded

The following are excluded from any network outage time when calculating the Circuit Availability:

- Network downtime during the Service Provider's scheduled maintenance windows
- The failure of any components which cannot be corrected due to inaccessibility to the customer site or customer equipment and other causes beyond reasonable control of networkMaryland
- Local Loop Circuits which another vendor such as Verizon, AT&T and WorldCom provides.
- Force Majeure (Natural Disaster, Acts of War or Terrorism and other forces beyond networkMaryland control).

6.7.3   Core Network Availability Remedies:

Upon verification that the core network is operating below the Committed Core Network Availability rate of 99.9%, networkMaryland shall evaluate the network and take corrective action to remedy the problem. networkMaryland will work as quickly as possible to restore the Core Network Availability to the Committed Core Network Availability.

7 - networkMaryland Acceptable Use Policy (AUP) (9/30/03)

These statements represent the acceptable use policy of networkMaryland. All Customers (organizations connected to networkMaryland) shall comply with this policy. Each Customer is responsible for the activity of its users and for ensuring its users are aware of this policy. Reference to and acceptance of this policy shall be stated in the acceptable use policies of all Customers connecting to networkMaryland. Any determination of inappropriate use or violation of this policy shall be promptly reported to the Department of Budget Management for appropriate action up to and including Customer termination of service.

- Customers may not transmit any material that:
  - Violates any applicable local, state, national or international law or contract and license agreements.
  - Threatens or encourages bodily harm or destruction of property.
  - Promotes a business, products or services not consistent with networkMaryland's service mission.
  - Constitutes copyright or trademark infringement or transgression of other proprietary rights of any third party.
- Customers may not resell, barter or exchange services.
- Customers may not engage in any unauthorized or unplanned network disruptions or activities that interfere with the ability of other users to make effective use of the network.
- Commercial for profit activity of any kind is forbidden. At cost or cost recovery services require the review of the networkMaryland Advisory Group and approval of the Department of Budget Management.
- Repeated, unsolicited and/or unwanted communication of an intrusive nature, including spamming, is not acceptable.
- Customers will file incident reports related to any local network outages or disruptions.
- Customers understand and are in compliance with the technical requirements, including IP addressing, for connecting to networkMaryland.
- Customers may not reveal documents or information gained as a networkMaryland user that may show network vulnerability.

In an emergency and in order to prevent further possible inappropriate, unlawful or damaging network activity, networkMaryland may temporarily disconnect a Customer. If the Department deems this necessary, every effort will be made to inform the Customer prior to disconnection, and every effort will be made to re-establish the connection as soon as it is mutually deemed safe. Any costs incurred by this de-activation and re-activation shall be the responsibility of the offending Customer. In the event a potentially harmful condition exists in the services received from networkMaryland, networkMaryland reserves the right to turn off a specific port or ports to prevent any Customer's network from being affected by the potentially harmful condition.

The Department reserves the right to revise, amend, interpret or modify this AUP and other related policies. The Department of Budget & Management is the final authority on questions of acceptable use of the network. Periodic audits may be conducted by the Department of Budget Management to enforce this policy.

8 - Customer Responsibilities

a) **Customer Premise Equipment (CPE):**

   i) Customer shall provide, install, configure and maintain a firewall for all Internet and Statewide Government Intranet (SwGI) services.

   ii) Customer shall provide the technology protection measures required to ensure compliance with applicable State of Maryland and Federal regulations.

   iii) Customer shall provide, install, configure and maintain any additional CPE such as a CSU/DSU and router which may be required to receive service from networkMaryland. The equipment shall be compatible with networkMaryland interfaces and Local Loop provider if utilizing a 3rd party Local Exchange Carrier (LEC) to interconnect with networkMaryland.

   iv) The configuration of any CPE will be the responsibility of the customer prior to the initial scheduled service turn-up date. The Customer shall be ready to test the service within 30 days of notification that networkMaryland has activated the service.

b) **Ordering of 3rd Party LEC Circuits:**

   i) Customer will order any third party telecommunication services required to interconnect with networkMaryland. The technical specifications of the circuit will be provided to the Customer by networkMaryland. The Customer will be responsible for ordering the circuit from the LEC.

   ii) Customer will be responsible for all costs related to these 3rd Party Circuits including extended demarcations, technician dispatches for troubleshooting or problems relating to Customer Premise Equipment.

   iii) Customer is responsible for following all guidelines and processes described in the *Getting Connected Package*.

c) **Service Acceptance**

   i) Once the networkMaryland service is available to the Customer, a Customer Acceptance Form will be sent to the customer for completion. Upon successful testing of the service, the form must be completed by the customer and returned to the Customer Manager within 30 days of service activation.

   ii) It is the Customer's responsibility to notify networkMaryland if there are issues with the new service activation.

d) **Security:**

   i) Customer shall follow the guidelines in the *networkMaryland Acceptable Use Policy (AUP)* which can be found in Section 7 of this document.

   ii) Customer shall adhere to the *State of Maryland Information Technology Security Policy and Standards*

   iii) Customer is responsible for the content of their data.

iv) Customer is responsible for any and all acts that have traversed to another Customer's network.

e) **Customer Network Management:**

i) The management of the customer network is the sole responsibility of the customer. The customer controls customer network equipment, including the CPE connecting to the networkMaryland infrastructure. Any failures of this equipment or required upgrades will be the responsibility of the customer.

ii) Notification to the networkMaryland NOC is required when Customer is performing routine maintenance of equipment or troubleshooting any 3rd party LEC circuits.

f) **Facility Access:**

i) Customer shall provide 24x7x365 access to any facility that contains networkMaryland owned equipment to allow installation, testing, troubleshooting and site survey.

ii) A contact list for customer's personnel responsible for network operations is required to ensure proper notification and access to networkMaryland maintained network elements.

g) **General:**

i) Customers shall provide at least one technical support point of contact
ii) Customer shall notify nwMD if the technical point(s) of contact change.
iii) Customer agrees to the networkMaryland connection requirements, as specified in this document
iv) Any requests for additional bandwidth must be made via the JCR 49 WAN Request process.

h) **Standards:**
networkMaryland Customers will adhere to the following standards (where applicable):
- RFC1483 - Multiprotocol Encapsulation over ATM Adaptation Layer 5
- RFC1490 - Multiprotocol Interconnect over Frame Relay
- RFC1918 - Address Allocation for Private Internets
- AF-TM-0121.000 – Traffic Management Specification version 4.1
- AF-PHY-0062.000-155.52 Mbit/s Short Wavelength Laser Physical Layer
- AF-PHY-0128.000- 622 and 2488 Mbit/s Cell-Based Physical Layer
- AF-SIG-0061.000- User-Network Interface (UNI) standard Specification Version4.0
- AF-UNI-0100.002- User-Network Interface Specification V3.1
- AF-UNI-0010.001- ATM User-Network Interface Version 3.0
- IEEE 802.1q - Virtual LANs
- IEEE 802.1d -MAC Bridges
- IEEE 802.2 - Logical Link Control Layer
- IEEE 802.3 - CSMA/CD Access Method

i) OSI Reference Model:
    i) For ISP and SwGI services, networkMaryland is only responsible for the first three layers of the OSI reference model (Physical and Data Link and Network.) Customers are responsible for layers four through seven (Transport, Session, Presentation and Application Layers.)

    ii) For InterLATA transport services, networkMaryland is only responsible for the first two layers of the OSI reference model (Physical and Data Link.) Customers are responsible for layers three through seven (Network, Transport, Session, Presentation and Application Layers.)
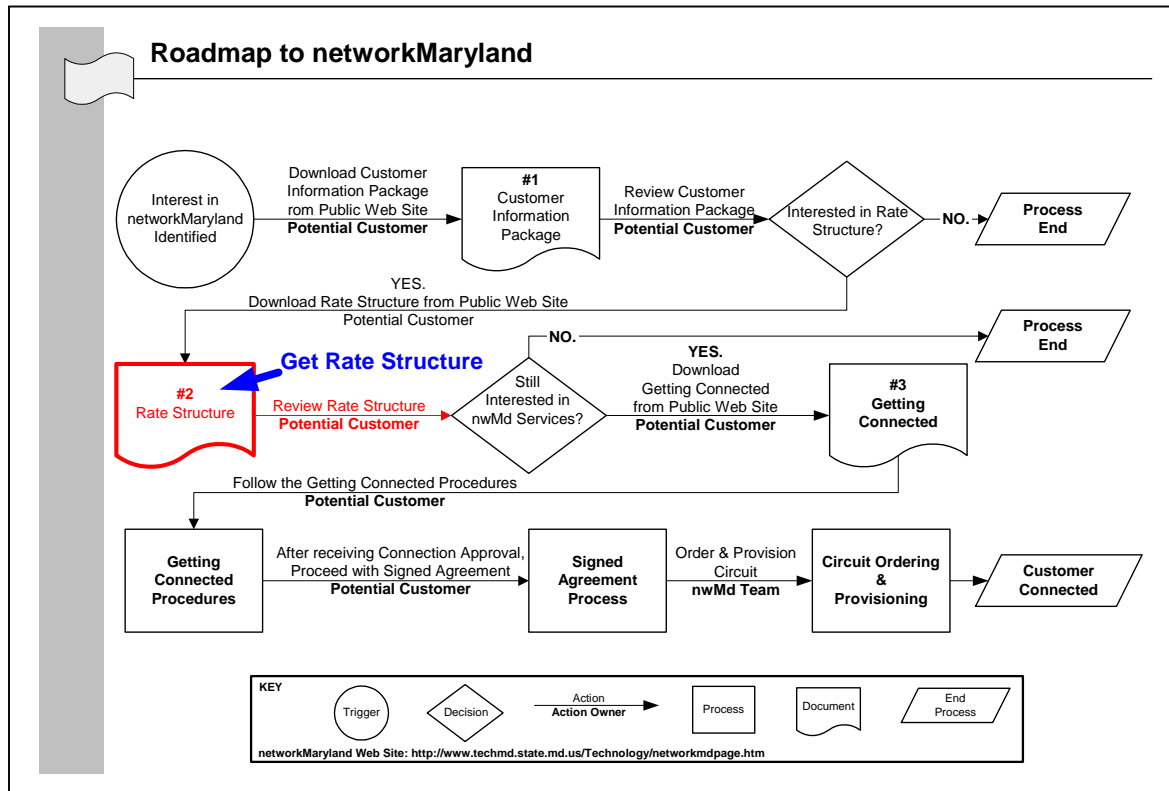
9 - Next Steps

Figure 6. Roadmap – Get Pricing